The effect of mothers' socioeconomic status and postpartum depression on children's early language development

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Master's thesis in Speech and Language Pathology

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Abstract for Master's thesis

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Language development is influenced by several biological and environmental factors in a child's life. One environmental factor that has raised much attention in this field is the socioeconomic status (SES) of the family and whether it affects children's language development. Another considered risk factor for children's language development is maternal postpartum depression, which may affect mothers shortly after giving birth. It has been discussed also whether the effect of postpartum depression differs dependent on the mother's socioeconomic status. The aim of this study was to explore the association between the socioeconomic status of the mother and the language development of children at 14 months of age. In addition, the thesis explored whether the association between mothers' postpartum depression and children's language development differs depending on the mothers' SES. Based on the mothers' education, three socioeconomic groups were created and formed the measurement of SES. Depressive symptoms in mothers were assessed by the Edinburgh Postnatal Depression Scale on three occasions after giving birth (*i.e.* 3, 6 and 12 months postpartum). Children's receptive and expressive vocabulary as well as their use of gestures were assessed by the MacArthur Communicative Inventory at 14 months of age. Confounding variables that have been identified as influencing language development, such as gender, gestational weeks, mother's age and her use of smoking, were controlled for in the analyses. The results revealed no statistically significant association between the mothers' SES and children's language development at 14 months. In other words, no statistically significant associations were found between the mothers' SES and children's receptive or expressive vocabulary, neither with their use of gestures. It appears that other confounding variables might better explain the variations in language development among children. In this study gender and gestational weeks explained part of the variation in both receptive and expressive language development of the participating children. In addition, mothers age explained part of the expressive development and smoking part of the receptive development. The effect of the mothers' postpartum depression on children's language development did also not differ between different SES-groups. In future research about this subject, the effect of SES on children's language development should be assessed also with children in higher ages, because the effects of SES can probably not be seen until the language development has proceeded a bit further. Further information regarding the mothers' use of medication or received therapy because of the postpartum depression should also be included to enable reliable conclusions about associations between mothers' postpartum depression and children's language development.
Key words: EPDS, language development, MCDI, postpartum depression, socioeconomic status
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Barns språkutveckling påverkas av olika biologiska faktorer och omgivningsfaktorer. En omgivningsfaktor som har uppmärksammats inom detta område är familjens socioekonomiska status (SES) och i vilken utsträckning dess inverkan har på barnets språkutveckling. En annan riskfaktor som anses påverka barnets språkutveckling är postpartumdepression hos mamman, som kan drabba mammor efter förlossningen. Det har också diskuterats hurvida mammans postpartumdepression påverkar språkutvecklingen hos barnet olika beroende på mammans socioekonomiska status. Syftet med studien var att undersöka sambandet mellan mammans socioekonomiska status och barns språkutveckling vid 14 månaders ålder. Därtill undersöktes det i studien hurvida associationen mellan mammans postpartumdepression och barnets språkutveckling påverkas på olika sätt i olika socioekonomiska grupper. Mammorna delades in i tre grupper utgående från deras utbildning och skapade på så sätt måttet av SES. Mammornas depressiva symptom bedömdes med hjälp av screening-testet Edinburgh Postnatal Depression Scale under tre tillfällen efter förlossningen (3,6 och 12 månader efter förlossning). Barnens receptiva och expressiva ordförråd samt deras användning av gester bedömdes med hjälp av formuläret MacArthur-Bates Communicative Inventory vid 14 månaders ålder. Övriga faktorer som har visats ha en inverkan på språkutvecklingen, som exempelvis kön, gestationsveckor, mammans ålder och rökning under graviditeten, beaktades i analyserna. Resultatet visade att det inte fanns en statistisk signifikant association mellan mammornas SES och barnens språkutveckling. Det fanns ingen statistiskt signifikant association mellan mammornas SES och barnens receptiva eller expressiva ordförråd, inte heller med deras användning av gester. Det tyder på att andra variabler bättre kan förklara variationer i språkutvecklingen hos barn. I den här undersökningen förklarade kön och gestationsveckor en del av variationen i både det receptiva och expressiva ordförrådet. Därtill förklarade mammans ålder en del av variationen i barnens expressiva ordförråd och rökning under graviditeten förklarade en del av variationen i barnens receptiva ordförråd. Effekten av mammans postpartumdepression på barnens språkutveckling var också den samma oberoende av socioekonomisk grupptillhörighet. I framtida forskning kring ämnet kunde det vara fördelaktigt att undersöka effekten av SES på barns språkutveckling även hos äldre barn, eftersom effekten kanske syns först i ett senare skede av språkutvecklingen. Information angående mammornas läkemedelsanvändning och tillgång till terapi på grund av postpartumdepressionen kunde också ha inkluderats för att möjliggöra mera tillförlitliga antaganden angående associationen mellan mammornas postpartumdepression och barnens språkutveckling.
Nyckelord: EPDS, MCDI, postpartumdepression, socioekonomisk status, språkutveckling

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1 Introduction

The prerequisites for children to acquire language are formed by biological factors but are also influenced by a child's environment (Hoff, 2006). Most of the aspects concerning speech and language development children learn and experience during their first years of life and many of these experiences depend on the parents' or caregivers' actions (Bornstein & Bradley, 2002). There has been an interest among researchers to explore the effect of these different environmental factors on children's early language development. For example, different family factors, such as economic or ethnic differences have been considered to influence early parent-child interactions (Pace, Luo, Hirsh-Pasek, Michnick & Golinkoff, 2017; Rowel & Goldin-Meadow, 2009) and parenting style (Hoff, Laursen & Tardif, 2002; Raviv, Kessenich & Morison, 2004) which in turn might affect children's speech and language development. These environmental factors have also shown to predict children's later cognitive and academic achievement (Bradley & Corwyn, 2002). Therefore, it is of importance to examine which factors, and to what extent, that have an impact, on children's speech and language development.

1.1 Factors influencing speech and language development

Gender is a biological factor that has shown to impact language development. In the study by Eriksson et al. (2012), girls were generally ahead of boys on all language areas and the differences increased up to 2 years and 6 months of age. Prematurity is another factor that repeatedly has shown to be a risk for delayed language development (Foster-Cohen, Edgin, Champion & Woodward, 2007; Lee, Yeatman, Luna & Feldman, 2011; Schirmer, Portuguez & Nunes, 2006) but, it appears that language development can be affected also for children who are not premature but born early term as well (Stene-Larsen et al., 2014). Children born before gestational week 37 are considered as premature (Parikka & Lehtonen, 2007). In Bruun's pro gradu study (2019), the results indicated that although premature children had been excluded from the analysis, gestational weeks still significantly predicted the language level of children at 14 months of age. Furthermore, associations have been found between maternal age and children's language development, suggesting that lower maternal age is associated with lower language level in children (Keown, Woodward & Fielda, 2001). Lastly, maternal

smoking during pregnancy has shown to be associated with negative outcomes in children's early language development (Key et al., 2007).

One environmental factor that has raised much attention in this field is the socioeconomic status (SES) of the family (Noble, McCandliss & Farah, 2007). Numerous studies have investigated the relation between a family's SES and different developmental and health outcomes in children. Although SES is a widely studied subject, there is to date no final definition of the term agreed by researchers (Bradley et al., 2002). In the literature, measurements of SES differ, but are often seen to be based on either occupation, education or income levels (Adler & Ostrove, 1999; Noble et al., 2007; Raviv et al., 2004). Families with a higher parental SES typically present a better physical and mental health, cognitive performance and academic achievement (Farah, 2017). Meanwhile, lower parental SES associates with experiencing more stress factors in the environment, as well as instability and psychiatric illnesses, such as depression (Pace et al., 2017). It has also been observed that the occurrence of smoking during pregnancy is higher for mothers in lower SES-groups (Ekblad, Gissler, Korkeila & Lehtonen, 2013).

In families with a higher SES, the possibilities are better for the parents to be able to provide their children with necessary inputs such as nutritious meals and childcare settings, and also stimulating environments for the child's language development in the form of books or toys (Bornstein et al., 2002). Differences in these factors therefore raise the question whether and how language development in turn will be affected by this variance. For instance, quantity and quality of interactions between parent and child as well as language stimulating environments, have shown to have crucial effects on language development (Pace et al., 2017).

Uncertainty remains whether the effect of SES on children's language development is consistent worldwide, but there is evidence showing that the SES of the family might not have the same influence on children's language development in countries where access to high-quality health care and education is more equal for all citizens (Adler et al., 1999; Pace et al., 2017). This information is important to identify relevant risk and resilience factors and ultimately to develop targeted measures to support children's language development both on societal, family and individual levels.

Previous research also suggests that mothers in lower SES-groups are at a higher risk of suffering from some form of depression than mothers in higher SES-groups (Serge, O'Hara, Arndt & Stuart, 2007). Even though all mothers from different SES-groups are at risk of postpartum depression, an elevated risk is related belonging to lower SES-categories (Goyal, Gay & Lee, 2010). Postpartum depression refers to a type of depression in mothers that can begin anytime within the first year after childbirth (World Health Organization, 2018). According to the definition in World Health Organization (2018), symptoms that may occur are feelings of sadness, anxiety and an experience of sleep disturbance. The prevalence of postpartum depression is around 10-15% in new mothers (Grace, Evindar & Stewart, 2003). This type of psychological stress of the mothers, has been shown to affect different domains of children's development (Lupien, King, Meaney, & McEwen, 2000). More specifically, having depressive symptoms, whether during the prenatal or postpartum period, has for example been considered as a risk factor for delayed language development in children (Paulson, Keefe & Leiferman, 2009).

1.2 Relationship between socioeconomic status and children's language development

The relationship between the family's SES and children's language development has been a subject of interest among researchers. Studies have repeatedly shown differences in language development among children by parental SES (Fernald, Marchman & Weisleder, 2013; Korpilahti, Kaljonen & Jansson-Verkasalo, 2016; Noble et al., 2007; Pungello, Iruka, Dotterer, Mills-Koonce & Reznick, 2009). However, uncertainties remain about in which age these differences start to occur and what exactly it is about SES that affects language development.

Possible theories about how the family's SES affects language development of children have been proposed. One contributing factor could be that differences in SES are related to differences in environments, which means that children experience different language environments (Hoff & Laursen, 2002). Varying language learning opportunities, experience and exposure are all factors that affect language development (Hoff, 2003; Pace et al., 2017). Early findings by the British sociologist Bernstein (1970), imply that mothers in different SES-groups speak differently to their children. As a result, children

acquire different communicative abilities. Consistent with this, more recent studies have repeatedly shown similar results (Hoff, 2003; Rowe, Özçalışkan & Goldin-Meadow, 2008). In studies where researchers have examined the role of language exposure in families with different SES, the results show that mothers with a higher SES are more likely to speak more frequently to their children, use a richer vocabulary and ask more follow-up questions (Hoff- Ginsberg, 1998; Hoff et al., 2002; Hoff & Tian, 2005). These are all factors that support positive outcomes for the language development (Hoff & Tian, 2005). Another hypothesis is that parenting might have an influence on children's language development. It has been shown that parenting in lower SES-groups is more associated with a less responsive and more restrictive parenting style, while parenting in higher SES-groups are shown to be less restrictive (Raviv et al., 2004). Also, Pungello et al., (2009), have results showing that parenting is a partial mediator of the relationship between the family's SES and expressive skills among children.

One of the most challenging parts of evaluating the language development of children around 1 year of age is likely to be the way of performing the assessment. Since children during their first year of life do not use a large amount of verbal communication, language development must be assessed by other means, e.g. their use of gestures (Fernald et al., 2013). In the study by Rowel et al. (2009), an association between children's early use of gestures and later language development was found. Children of families with a higher SES frequently used more gestures at 14 months of age in parent-child interactions and they also showed a larger vocabulary at 54 months of age, compared to children of families with a lower SES. Another way of studying early language development was carried out by Clearfield, Bailey, Jenne, Stanger and Tacke (2014). They measured early language development with the number of exploratory behaviors, such as oral and manual object exploration, when the child was 6, 9 and 12 months of age. The measurement of SES was in this study based on maternal education and three SES-groups were created (low, mid and high). The results showed that differences in children of different SES-groups could be seen already at this age. The children in the lower SES-group showed less exploration overall than their peers in higher SES-groups.

Korpilahti et al. (2016), studied a number of biological and environmental risk factors for language delay in children at 13-36 months in a Finnish cohort study. According to their results, the children of parents with a higher education and social class showed

better skills in language comprehension, compared to the children of parents in the lower SES- groups. Pungello et al. (2009), found that children in families with a lower SES showed a slower rate of growth in expressive language between the ages of 18 and 36 months, compared to the children in families with a higher SES. Similar results were found in the study by Fernald et al. (2013), where children's early language development was assessed at 18 and 24 months of age in different SES-groups. The results showed that there were striking differences between children in lower and higher SES-groups as early as 18 months when comparing vocabulary size and language processing skills. The children from the lower SES-groups had significantly lower vocabulary scores than their peers in higher SES-groups at 18 months and the trend was also observed at 24 months. Moreover, differences in language development in different SES-groups were found by Hoff (2003), who studied the influence of SES in the context of the amount of maternal speech. The results showed that differences in children's productive vocabulary could be explained by different use of maternal speech in different SES-groups so that lower SES is related to less frequent speech by the mother.

Furthermore, Vasilyeva, Waterfall, and Huttenlocher (2008), studied the syntactic development of children in different SES-groups, and found that no differences between the groups at 14 and 18 months were visible, but the differences started to appear at 26 months of age. At this point, the children in the higher SES-group showed much more frequent use of complex sentences. Huttenlocher, Waterfall, Vasilyeva, Vevea and Hedges (2010) also found that differences in the syntactic structures that caregivers use, affect the language development of the children.

1.3 Relationship between maternal postpartum depression and children's language development in different socioeconomic groups

In the association between maternal postpartum depression and children's language development, a crucial element is likely to be the mother's way of caregiving when experiencing symptoms associated with depression, such as sadness or withdrawal. This might negatively affect the language development of the child (Stein, Malmberg, Sylva, Barnes & Leach, 2008). The verbal communication between mothers who suffer from postpartum depression and their infants seems to differ compared to non-depressed

mothers. During interactions, mothers with depression have shown to be less vocally expressive and to use fewer facial expressions than non-depressed mothers (Sohr-Preston & Scaramella, 2006). In studies about this relationship, the hypothesis is often that due to mothers' depression symptoms, their children's language development will be negatively affected.

Still, studies present somewhat contradicting results about children's language development outcomes associated with maternal postpartum depression. In the study by Quevedo et al. (2011), the association between maternal postpartum depression and children's language development was evaluated at 30 to 90 days after delivery and at 12 months after delivery. The results showed that delayed language development of children at 12 months of age was significantly associated with maternal postpartum depression. Children of mothers who suffered from postpartum depression scored lower on the language development scale compared to children who had been exposed to mother's depression only at one occasion or not at all. Importantly, another study showed small or no effects of maternal postpartum depression on children's early language development (Cornish et al., 2005).

Another hypothesis is that exposure to maternal depression have different effects on children's language development in families with a different SES (Kurstjens & Wolke, 2001), still the amount of studies regarding this subject is rather small. In the study of Kurstjens et al. (2001), children in families with a lower SES and with mothers suffering from postpartum depression, had lower language scores compared to their peers in families with a higher SES. Furthermore, Stein et al. (2008) found that maternal postpartum depression was associated with poorer language development, but only indirectly as a result of poorer caregiving related to the maternal postpartum depression. Later, when the sample in the study was split by the effect of socioeconomic factors, the effect of depression and caregiving was remarkably stronger for children in families with a lower SES. The results from these studies indicates that the effect of maternal postpartum depression on children's language development might differ in different SES-groups but data especially among young children at their early stages of speech and language development is scarce.

1.4 Aim of the thesis

The aim of this study was to explore the association between the socioeconomic status (SES) of the mother and the language development of children at 14 months of age. In addition, the thesis explored whether the association between mothers' postpartum depression and children's language development differs depending on the mothers' SES. Examining the influence of environmental factors on children's language development is of importance in prevention and intervention purposes. This study also provides follow-up information about the effects of maternal depression on children's language development (Bruun, 2019) but in our case during the postpartum period.

2 Method

The present study is a sub-study of the FinnBrain research project. FinnBrain is an ongoing cohort study that has gathered information about Finnish children and their families with the aim of studying the combined influence of environmental and genetic factors on children's development from the prenatal period until adolescence (https://sites.utu.fi/finnbrain/en/). The study consists of 3837 families from Southwest Finland and the Åland Islands. The Ethics Committee of the Hospital District of Southwest Finland has approved the FinnBrain study protocol.

2.1 Participants and data gathering

The mothers and their partners were recruited during pregnancy via health clinics at the time of their first ultrasonography appointment, between 2010-2015. Information regarding the families and their children are collected via questionnaires, registers, physiological measures and study visits. The participants consisted of both Finnish- and Swedish-speaking families, altogether 3837 families.

For the current analysis, the data about the mothers' SES, their child's receptive and expressive vocabulary, as well as use of gestures at 14 months of age and the mothers' level of depression 1 year postpartum was used. Mothers with missing information on their education, depressive symptoms, and language development of their child were excluded.

Additionally, due to differences concerning the number of words in the language measurement forms for Finnish- and Swedish-speaking children, only the data from the Finnish-speaking children were included in the current analysis. Lastly, premature children defined as born before gestational week 37 (Parikka et al., 2017, p. 9) were excluded, leaving 1096 participants. The children in the sample consisted of 52% boys (n = 710) and 48% girls (n = 631). The participants and the exclusion criteria are presented in the flow chart in figure 1.

2.2 Measures

The outcome variable consisted of the expressive and receptive vocabulary as well as use of actions and gestures of the children, measured by the Finnish version MacArthur Communicative Development Inventories (MCDI) (Fenson et al., 1993; the Finnish version by Lyytinen, 1999). In the present study, maternal education was used as a measurement of socioeconomic status and formed the predictor variable. Furthermore, the total sum score of self- reported depressive symptoms assessed by the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden & Sagovsky, 1987) was used as an additional predictor variable.

2.2.1 MacArthur Communicative Development Inventories

The Finnish version (Lyytinen, 1999) of the MacArthur Communicative Development Inventories (MCDI) (Fenson et al. 1993) form was used to collect information about the children's language and communication development in the present study. The MCDI is a widely used parental report instrument for examining the communicative skills of infants between 8-16 months of age and toddlers between 16-30 months of age. In the current study the infant version was used. Parents were asked to complete the form when the children were 14 months of age.

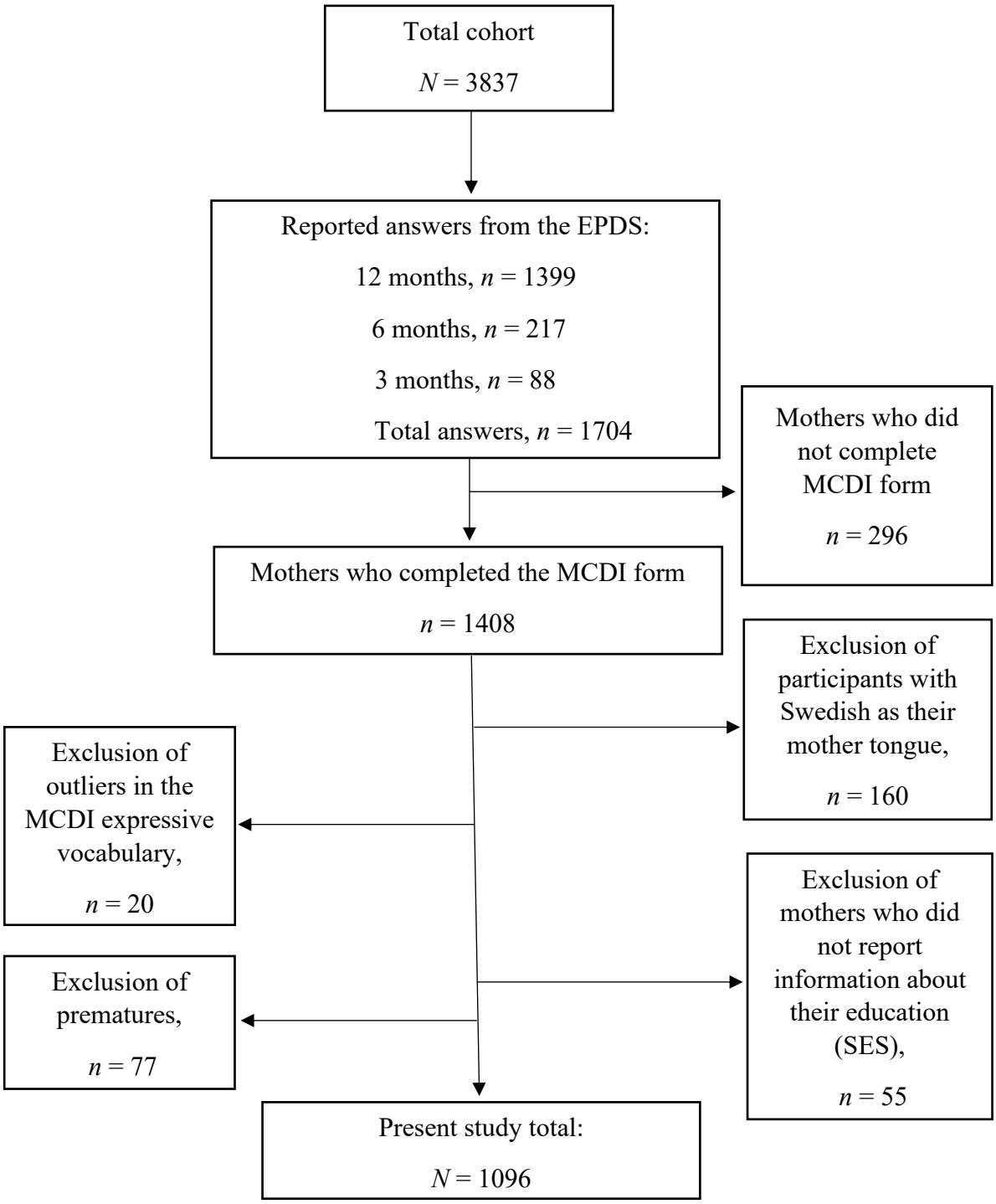

Figure 1. Flow chart of the participants in the present study.

*EPDS= The Edinburgh Postnatal Depression Scale. The form was used to gather information regarding the mothers' depressive symptoms during the postpartum period.

*MCDI= MacArthur Communicative Development Inventories. The form was used to gather information about the children's language and communication development.

The first sections of the MCDI form (A-C), measures the child's ability to respond to simple questions and instructions given by the parents and attempts of imitation of parent's speech. The D-section measures the child's receptive and expressive vocabulary. This part includes a vocabulary checklist of 380 words, with two separate columns for comprehension and production. Parents mark those words that the child understands, or both understands and produces. According to Lyytinen (1999), the mean value of Finnish children's receptive vocabulary at 14 months of age is 163.6 words and for expressive vocabulary 17.0 words. The second part of the form measures preverbal communicative skills such as actions and gestures. Since infants do not necessarily use verbal language at this age, this part provides important information also about their non-verbal communication. The first section (A) measures early communicative gestures, with the options "not yet", "sometimes" or "often". The remaining sections (B-E) measure communicative gestures in play situations, actions with objects and imitation of adults' actions, with "yes" or "no" options. The mean value of children's actions and gestures are, for Finnish children at 14 months of age, 40.4 (Lyytinen, 1999).

2.2.2 Socioeconomic Status

Varying ways of measuring socioeconomic status (SES) have been proposed (Bradley et al., 2002; Pace et al., 2016). In the current study, maternal level of education was used as a measurement of SES. According to Shavers (2007), the level of education is one of the most widely used indicators of SES and is often referred to as the most basic component of SES due to its impact on future occupational opportunities. Education as an indicator of SES also has the advantage of being easily accessible and excluding only few members of the population. According to Westerlund and Lagerberg (2008), maternal education is a particularly influential component since the mothers tend to be intensively involved in daily interactions with the child. In the present study, three socioeconomic groups were created. The first group consisted of mothers who completed or completed parts of elementary school, high school or graduated from a vocational school (low SES group). The second group consisted of mothers who graduated from a higher vocational school (mid SES group) and lastly, the third group consisted of mothers who had a lower or higher university degree or a doctoral degree (high SES group).

2.2.3 The Edinburgh Postnatal Depression Scale

Information regarding depressive symptoms of the mothers was collected with The Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden & Sagovsky, 1987). Mothers were asked to complete the form at three occasions prenatally, during pregnancy week 14, 24 and 34, and at three occasions postnatally, 3, 6 and 12 months after childbirth. Since the present study evaluates the effect of mothers' postpartum depression, only the data regarding the postpartum period was included. The self-reporting questionnaire consists of 10 statements about the mother's feelings during the past 7 days. The mother chooses one out of four alternatives that are closest to her experienced feelings during those days. The alternatives are scored from 0-3 and are based on their seriousness. When adding together the scores for each of the 10 items the maximum score is 30 points. According to Matthey, Henshaw, Elliott and Barnett (2006), the recommended cut-off point for postpartum depression is 10 points or more and is therefore used in the present study.

Since the effect of the mothers' postpartum depression was one of the main factors studied, the results from the depression questionnaire filled in one year postpartum was mostly relevant to use since it is the closest time to the children's language measurement, which was when the children were 14 months. Unfortunately, not all mothers completed the form at this point but some of them had filled in the questionnaire at 6 months after delivery and some only after 3 months of delivery. To avoid exclusion of the mothers who might have suffered from depression but did not complete the form at one year postpartum, a new variable was created that also included responses from the mothers who only completed the form at 6 or 3 months postpartum. The decision to combine the responses was made to increase the chance of receiving a more reliable result. At 12 months postpartum, 1399 responses from the mothers' EPDS form were collected. At 6 months, 217 responses were collected and at 3 months, 88 responses were collected, leaving a total of 1704 responses from the EPDS form. However, 296 of them had not completed the MCDI form and 312 of them and had to be excluded from the study for other reasons (see Figure 1).

2.3 Statistical analyses

The relationship between children's language development and the SES were examined by a hierarchical multiple regression analysis. Altogether three separate models were computed which differed with respect to the outcome variable of interest. In the first model, the MCDI receptive vocabulary score served as the outcome variable, whereas the MCDI expressive vocabulary score served as outcome variable in the second model. In the third model, the MCDI use of gestures score served as the outcome variable. The confounders and the predictors in the three models were exactly the same.

The hierarchical multiple analyses were performed in a two-step procedure, by first entering the potential confounders in the first step and then the predictor variable SES in the second step. Potential confounders that were controlled for were gender, gestational weeks, mother's age and her use of smoking. Smoking during pregnancy was dummy coded, so that those mothers who reported smoking at some point during pregnancy were categorized as "smokers", and those mothers not reporting smoking at all during pregnancy were categorized as "non-smokers" (see Figure 2).

The second part of the study was to examine whether associations between maternal postpartum depression and children's language development was altered depending on the mother's SES. Here, we employed three separate two-way ANOVAs where the respective language variable of interest served as the outcome variable (i.e., expressive vocabulary, receptive vocabulary, and use of gestures). In all models, the EPDS scores were dummy coded. Those mothers who reported EPDS scores $\geq$ 10 were classified as depressed, whereas those mothers who reported EPDS scores < 10 were classified as non-depressed (see Figure 3). All statistical analyses for the current thesis were carried out by the IBM SPSS Statistics (version 25).

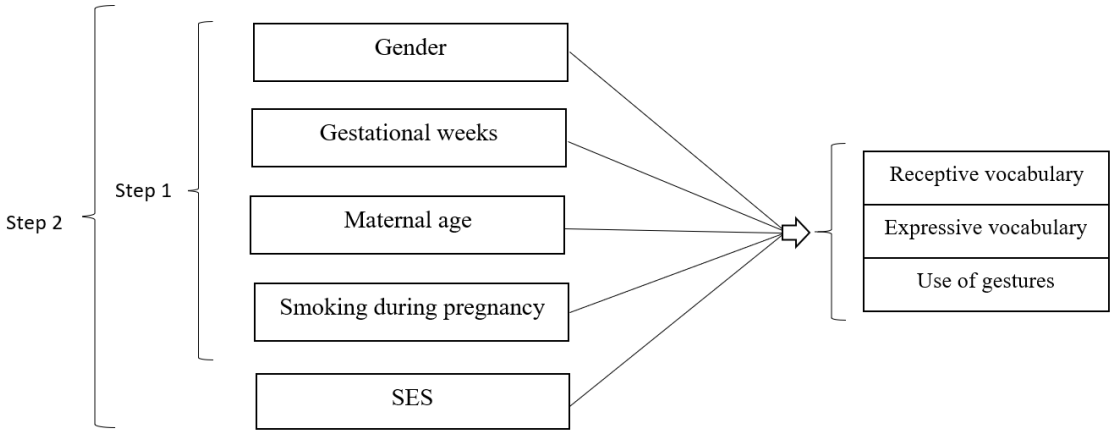

Figure 2. Schematic representation of the regression analyses.

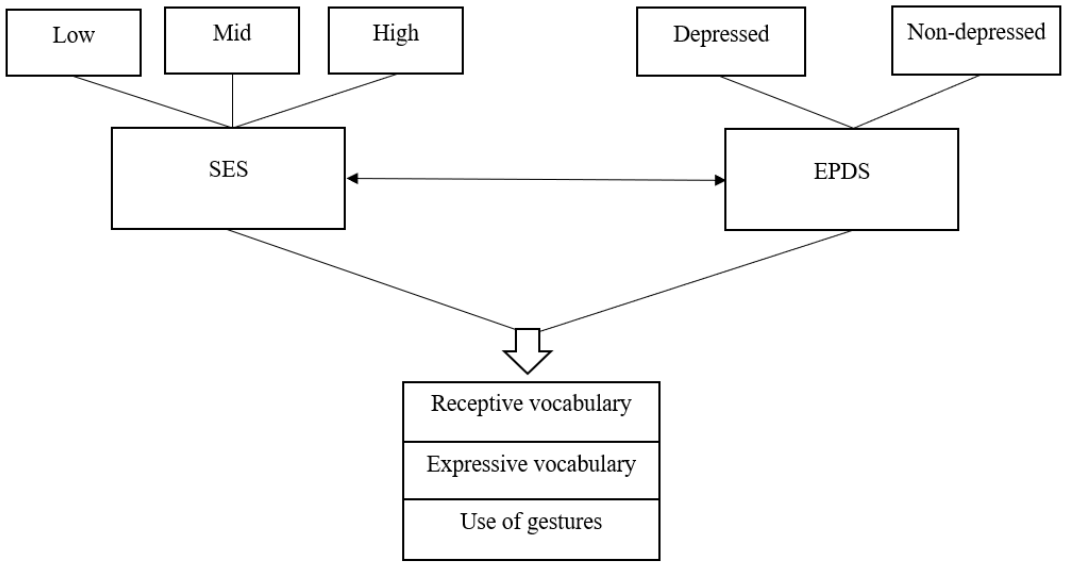

Figure 3. Schematic representation of the two-way ANOVA analyses.

3 Results

3.1 Descriptive statistics

The highest SES-group consisted of 426 mothers (38.9%), the mid SES- group consisted of 312 mothers (28.4%) and the low SES-group consisted of 358 mothers (32.7%). The mean length of gestation was 40 weeks (*SD* =1.23*, range*= 5.43) and the mothers mean age when giving birth was 31 years (*SD*= 4.5*, range*= 27). In the current sample, the prevalence of smoking at some point of pregnancy was 14% (*n*= 153).

At 14 months of age, the average receptive vocabulary of the children consisted of 120 words (*SD* = 73*, range* = 336) and the average expressive vocabulary consisted of 10 words (*SD* = 11*, range* = 54). The average use of gestures was 36 (*SD* = 9*, range* = 54). These findings were expected since children at this age are typically able to understand more than they can produce and therefore also use more non-verbal communication. Descriptive statistics for the MCDI is shown in Table 1.

Table 1

Descriptive statistics of the MCDI (14 months)

The MCDI	*n*	*M*	*Mdn*	*SD*	*Range*
Words comprehended (max 380)	1096	119.75	109.00	72.63	336.00
Words produced (max 380)	1096	9.98	6.00	11.20	54.00
Use of gestures (max 66)	1060	35.71	35.00	8.68	54.00

A significant difference was found in the MCDI scores of girls and boys. An independent samples t-test revealed that girls scored significantly higher than boys on all language parts (Receptive vocabulary: $t(1094) = -3.645$, $p < .001$, Expressive

vocabulary: $t(1094) = -5.309$, $p < .001$, Use of gestures: $t(1058) = -6.570$, $p < .001$). Descriptive statistics of the girls and boys MCDI scores are presented in Table 2.

Table 2

Descriptive statistics of the MCDI separately for boys (n = 574) and girls (n = 522)

The MCDI	*M*	*SD*	*Range*
Girls receptive vocabulary	128.09	73.12	336
Girls expressive vocabulary	11.69	11.85	54
Girls use of gestures	37.52	8.54	54
Boys receptive vocabulary	112.17	71.41	331
Boys expressive vocabulary	8.43	10.33	54
Boys use of gestures	34.08	8.48	48.44

The combined variable for the EPDS results consisted of 1081 answers. The average score of the sample was 5 points ($SD = 4$, *range* = 27). The prevalence of mothers being depressed (i.e., scoring $\geq$ 10 points in EPDS) for the whole sample was 13.5% ($n = 153$). There were slightly more depressed mothers in the low SES-category ($n = 61$, 5.7%), compared to the mid ($n = 43$, 4.0 %) and high ($n = 40$, 3.8 %) SES-groups. The prevalence of smoking at some point of pregnancy was also higher in the lower SES-group ($n = 102$, 28.5 %) compared to the mid ($n = 26$, 8.3%) and high ($n = 25$, 5.9%) SES-groups.

3.2 Correlations

Correlational analyses showed a non-significant correlation between SES and receptive vocabulary at 14 months of age ($r = 0.048$, $p = .113$). Likewise, a non-significant

correlation between SES and expressive vocabulary was found (r = -0.010, p = .736) and between SES and use of gestures (r = 0.003, p = .930).

The EPDS-scores significantly correlated with receptive vocabulary (r = -0.080, p = .008) but not with the expressive vocabulary (r = .009, p = .771) or use of gestures (r = -0.010, p = .738).

3.3 Receptive vocabulary

The collinearity statistics were all within accepted limits ($r < 0.7$), and the assumption of multicollinearity was therefore met. Very weak, statistically significant correlations were observed between gender and receptive vocabulary *(*r = 0.110, $p < .001$*)* and between gestational weeks and receptive vocabulary *(*r = 0.093, $p < .001$*)*. Maternal age was negatively associated with smoking (r = -0.141, $p < .001$). SES was also negatively associated with smoking (r = -0.270, $p < .001$).

A statistically significant regression equation was found for the first stage which included the control variables $F(4, 1091) = 7.528$, $p < .001$, and accounted for 2.7% of the variance in the outcome variable ($R^2_{adj} = 0.023$). Of these variables, gender (β = 0.107, $p < .001$), gestational weeks (β = 0.096, p = .001) and maternal smoking (β = -0.080, p = .008) significantly predicted the receptive vocabulary (Table 3). Adding SES to the model at stage 2, did not significantly increase R^2_{adj}, $F(5, 1090) = 0.590$, p = .443.

Table 3

Coefficients for hierarchical multiple regression with receptive vocabulary as outcome variable

Predictors	B	SE B	β	Sig.
Step one				
Gender	15.574	4.342	0.107	0.000
Gestational weeks	5.642	1.764	0.096	0.001
Mother's age	-0.011	0.488	-0.001	0.082
Smoking	-18.815	6.325	-0.080	0.008
Step two				
Gender	15.420	4.348	0.106	0.000
Gestational weeks	5.604	1.765	0.095	0.002
Mother's age	-0.130	0.512	-0.008	0.799
Smoking	-15.615	6.517	-0.075	0.017
SES (education)	2.154	2.806	0.025	0.443

A two-way ANOVA was conducted to examine the effect of SES and mother's depression on receptive vocabulary. The results showed a statistically non-significant main effect of depression $F(1, 1075) = 3.064$, $p = .080$, $\eta_p^2 = .003$. Likewise, the main effect of SES on receptive vocabulary was non-significant $F(2, 1075) = 1.152$, $p = .316$, $\eta_p^2 = .002$. There was no evidence for any interaction between maternal SES and depression on child's receptive vocabulary, $F(2, 1075) = .026$, $p = .974$, $\eta_p^2 = .000$.

3.4 Expressive vocabulary

Because the data on expressive vocabulary was not normally distributed, this variable was transformed using the square root log transformation. This procedure was performed to deal with the skewness of the distribution. Extreme outliers were also excluded for those participants who scored three times the interquartile range below the 1st or above the 3rd quartile. After performing these adjustments, the assumptions for multiple regression was met.

The collinearity statistics were all within accepted limits ($r < 0.7$), the assumption of multicollinearity was therefore met. Very weak, statistically significant correlations

were observed between gender and expressive vocabulary *(r* = 0.158*, p* < .001*)* and between gestational weeks and expressive vocabulary *(r* = 0.071*, p* = .009*).* Maternal age correlated negatively with expressive vocabulary *(r* = 0.071, *p* = .009*).* Maternal age was also negatively associated with smoking *(r* = -0.141*, p* < .001*)* and SES was positively associated with maternal age *(r* = 0.236*, p* < .001*).*

A statistically significant regression equation was found for the first stage which included the control variables $F(4, 1091) = 9.358$, $p < .001$, and accounted for 3.0% of the variance in the outcome variable ($R^2_{adj} = 0.030$). Of these variables gender ($\beta = 0.573$, $p < .001$) and gestational weeks ($\beta = 0.096$, $p < .001$) significantly predicted expressive vocabulary (Table 4). Adding SES to the model at stage 2, did not significantly increase R^2_{adj}, $F(5, 1090) = 0.045$, $p = .833$.

Table 4

Coefficients for hierarchical multiple regression with expressive vocabulary as outcome variable

Predictors	B	SE B	β	Sig.
Step one				
Gender	0.573	0.108	0.159	0.000
Gestational weeks	0.096	0.044	0.066	0.028
Mother's age	-0.019	0.012	-0.047	0.117
Smoking	0.141	0.157	0.027	0.368
Step two				
Gender	0.038	0.024	0.051	0.108
Gestational weeks	0.282	0.059	0.152	0.000
Mother's age	-0.015	0.007	-0.072	0.029
Smoking	0.148	0.161	0.028	0.361
SES (education)	0.012	0.070	0.005	0.867

A two-way ANOVA was conducted to examine the effect of SES and mother's depression on expressive vocabulary. The results showed a statistically non-significant main effect of depression, $F(1, 1075) = .447$, $p = .504$, $\eta_p^2 = .000$. Likewise, the main effect of SES on expressive vocabulary was non-significant $F(2, 1075) = .408$, $p = .665$,

η_p^2= .001. Finally, no evidence on interaction between maternal SES and depression on expressive vocabulary was observed, $F(2, 1075) = .384$, $p = .681$, $\eta_p^2 = .001$.

3.5 Use of gestures

The collinearity statistics were all within accepted limits ($r < 0.7$), the assumption of multicollinearity was therefore met. Very weak, statistically significant correlations was observed between gender and the use of gestures *(*$r = 0.198$, $p < .001$) and between gestational weeks and use of gestures *(*$r = 0.137$*,* $p < .001$*).* Maternal age was negatively associated with smoking *(*$r = -0.140$, $p < .001$*)* and SES was positively associated with both maternal age *(*$r = 0.336$*,* $p < .001$*)* and children's gender *(*$r = 0.052$*,* $p < .001$*)*.

A statistically significant regression equation was found for the first stage which included the control variables $F(4, 1055) = 16.093$, $p < .001$, and accounted for 5.4% of the variance in the outcome variable ($R^2_{adj} = .054$). Of these variables gender ($\beta = 0.195$, $p < .001$) and gestational weeks ($\beta = 0.134$, $p < .001$) significantly predicted the use of gestures (Table 5). Adding SES to the model at stage 2, did not significantly increase R^2_{adj}, $F(5, 1054) = .191$, $p = .662$.

Table 5

Coefficients for hierarchical multiple regression with use of gestures as outcome variable

Predictors	B	SE B	β	Sig.
Step one				
Gender	3.393	0.519	0.195	0.000
Gestational weeks	0.944	0.211	0.134	0.000
Mother's age	-0.016	0.058	-0.008	0.780
Smoking	-0.587	0.758	-0.023	0.439
Step two				
Gender	3.404	0.520	0.196	0.000
Gestational weeks	0.947	0.211	0.134	0.000
Mother's age	-0.008	0.062	-0.004	0.901
Smoking	-0.668	0.780	-0.027	0.392
SES (education)	-0.151	0.337	-0.015	0.655

A two-way ANOVA was conducted to examine the effect of SES and mother's depression on children's use of gestures. The results showed a statistically non-significant main effect of depression, $F(1, 1041) = 1{,}977$, $p = .160$, $\eta_p^2 = .002$. Likewise, the main effect of SES on children's use of gestures was non-significant $F(2, 1041) = 1.384$, $p = .251$, $\eta_p^2 = .003$. Finally, no evidence on interaction between maternal SES and depression on children's use of gestures was observed, $F(2, 1041) = 1.628$, $p = .197$, $\eta_p^2 = .003$.

4 Discussion

The aim of the thesis was to explore the association between the socioeconomic status of the mother and the language development of children at 14 months of age in Southwest Finland. In addition, the thesis explored whether the effect of the mothers' postpartum depression on children's language development differs dependent on the mothers' SES. When controlling for the confounding variables, no evidence on

interaction between maternal SES and children's language development was found. The results show no statistically significant association between the mothers' SES and children's receptive or expressive vocabulary, neither with their use of gestures at 14 months of age. It appears that the selected confounding variables explain the variations in language development among children to a greater extent than SES, the main predictor. The confounding variables such as gender, gestational weeks, mother's age and smoking during pregnancy was shown to have a certain impact on language development. The results also indicate that the influence of mothers' postpartum depression on children's language development was independent of maternal SES or level of education.

4.1 Socioeconomic status and language development

The current findings do not demonstrate a significant impact of the mothers' SES on children's language development in the current sample. There seems to be variation in how the SES affects children's language development in different countries and cultures. The findings in the current study differ from the results of several studies conducted in the US (Fernald et al., 2013; Noble et al., 2007; Pungello et al., 2009). One reason for this result could be, as previous studies have suggested, that the SES might not have the same effect on children's language development in countries where families have access to high-quality health care and where education is more equal for all citizens (Adler et al., 1999; Pace et al., 2017). In other words, in countries where the socioeconomic discrepancies are not significant, the effect might not be as evident. Finland is often referred to as one of the countries known for its high-quality and equal health care and education system (Halinen & Järvinen, 2008; Järvelin, 2002). Other studies performed in the Nordic countries have presented no statistically significant results of this relationship. For instance, in the study by Berglund, Eriksson & Westerlund, (2005), the conclusion was that SES was not associated with significant differences in early communicative skills in Swedish-speaking children at 18 months of age. Westerlund et al. (2008) also concluded that no association was found between maternal education as their marker of SES, and a child's vocabulary at 17-19 months of age. However, they found that the frequency of mothers reading to their children was highly increased with rising maternal education. Although, in the study by Eilertsen,

Thorsen, Holm, Bøe, Sørensen, and Lundervold (2016), significant results could be found of the relationship between SES and children's verbal comprehension in a Norwegian sample. Despite this, they highlighted that compared to the results from other non-Nordic countries, the strength of the relation was in this case weaker.

Another factor that is worth taking into consideration is the age of the children in the study population. A majority of previous studies reporting statistically significant results on associations between the mothers' SES and children's language development have included children at ages above 14 months. Therefore, it is possible that the influences of SES on children's communicative skills could also emerge in the current population only as the children get older. For instance, in the study by Reilly et al. (2009), maternal education was not associated with children's language development at 24 months of age. Furthermore, in the previously mentioned study by Vasilyeva et al. (2008), differences in the SES-groups were not noticeable until 26 months of age when the children in the higher SES-group used more complex sentences compared to their peers in the lower SES-group. In Zambrana, Ystrom, and Pons's (2012) study, a main effect of SES was found on children's language comprehension at 18 and 36 months of age, but the effect was also shown to be stronger with increasing age and was substantial at 36 months of age. Moreover, Berglund et al. (2005) highlighted the suggestion based on previous studies that the effect of SES is likely to increase with increasing age both in childhood and adolescence. These findings suggest that the effect of SES might be possible also in Finnish children participating in this study but that it is not evident because they are only 14 months old and their language development is in its early stage.

However, it is important to highlight the fact that the SES of the family is a multidimensional factor that covary with many other factors that influence the language development of the children. The causational relations of the SES effects are still unclear and therefore, making conclusive assumptions is challenging (Hoff et al., 2002).

4.2 Maternal postpartum depression and children's language development in different socioeconomic groups

The influence of the mothers' postpartum depressive symptoms on children's language development did not significantly differ depending on the mothers' SES. In other

words, even if SES is considered as a risk factor for depressive symptoms (Goyal et al., 2010), and studies present that maternal postpartum depression has an influence on children's language development, the result from the present study indicates that the effect of the mothers' postpartum depression on children's language development does not differ depending on the mothers' SES.

The prevalence of reported depressive symptoms among the mothers in the current sample was consistent with other prevalence reports regarding maternal postpartum depression (O'hara & McCabe, 2013). In this sample, the prevalence of depression was observed to be higher in mothers with a lower SES, which is also consistent with previous literature (Freeman et al., 2016; Serge et al., 2007), although the language development of their children did not significantly differ compared to the other groups. In the study by Goyal et al. (2010), mothers with a lower SES were associated with more depressive symptoms at 2 and 3 months postpartum compared to the mothers in the higher SES-group. According to the researchers, this result might be due to the lack of resources available to low SES mothers, (*e.g.* medical care, transportation, partner support). As previously mentioned, whether the effect of SES is evident or not in countries with a high-quality health care system has been discussed. According to Järvelin (2002), the quality of the Finnish health care is in general of a high standard. Every Finnish citizen has the right to health services regardless of ability to pay or place of residence and the public authorities are obligated to guarantee everyone adequate social, health and medical service. In other words, regardless of one's SES, one is entitled to the same health care. Mothers in Finland also have equal access to both prenatal and postnatal visits at a maternity clinic (Ministry of Labour, 1997) and from a survey made by Kojo-Austin, Malin and Hemminki (1993), women in Finland are, in general, satisfied with the maternity health care. Taking this into consideration, it may be that despite a higher prevalence of postpartum depression in the lower SES-group, the mothers' socioeconomic status does not interfere with their children's language development because, as previously discussed, SES is not shown to be a strong predictor for the children's language development in this study population.

Smith-Nielsen, Tharner, Krogh and Væver (2016), studied the long-term effect of maternal postpartum depression on children's language development. Their sample consisted of well-resourced and highly educated mothers and their children. The results showed no long-term effect of postpartum depression diagnosed 3-4 months postpartum

on children's language development at 13 months of age. These findings can be related to the present study, since the majority of the participants also mostly consisted of mothers with a higher SES.

In the pro gradu study by Bruun (2018), the relationship between prenatal maternal depressive symptoms and infant vocabulary was explored in a partially overlapping population as in the present study. The result indicated that the prenatal EPDS-scores correlated significantly with children´s receptive vocabulary at 14 months, but not with expressive vocabulary. Although when the confounders were held constant, prenatal depressive symptoms in mothers did not significantly predict later vocabulary development in children. Consistent with this, a similar trend was found in the present study. The EPDS-scores from postpartum period correlate significantly with children´s receptive vocabulary at 14 months of age. However, in combination with the SES variable, no significant effect of mothers' depression on children's language development was found.

4.3 Confounders

From the statistical analyses, it could be seen that several confounders predicted language development outcomes both in combination with the SES variable and by themselves. Since the SES of the mother did not significantly predict the outcomes in children's language development, the other confounders are likely to better explain differences in the children's language development.

In previous literature, gender differences have been well-documented in children's language development. Consistent with this, gender differences were found also in the present study. According to the MCDI results, girls scored significantly higher than boys. Gender was, in this study, shown to be a significant predictor for language development, which is consistent with the study by Korpilahti et al. (2016), who explored several risk factors for later language development in another Finnish cohort study. In their study, gender was shown to be the most powerful biological factor in predicting language delays.

Furthermore, gestational weeks were shown to be another significant predictor for language development. Even though prematurely born children were excluded from the

present study, gestational weeks remained as significant predictors of language level at 14 months of age. Consistent with this, in the study by Stene-Larsen et al. (2014), children not born premature but early term were at an increased risk for communication impairments at 18 and 36 months of age. This suggests that children born early term are also at risk of delayed speech and language development.

The mothers' age in combination with the SES variable also revealed a statistically significant effect on the expressive vocabulary. Although, this finding must be interpreted with caution since the expressive vocabulary variable was transformed.

Lastly, smoking in combination with SES showed a statistically significant association with the receptive vocabulary and as it was shown in this sample, smoking during pregnancy did occur more often in the lower SES-group, which is consistent with previous studies, suggesting that the prevalence of smoking is higher in the lower SES-groups (Ekblad et al., 2013).

4.4 Limitations of the study and plans for future research

Despite the advantage of a large sample size, the study had some limitations. In this study, only maternal education was used as a measurement of SES. Other factors could have been included to extend the measurement of the SES, (*e.g.* income, occupation). Although, maternal education is often used as a measurement itself, the combination of several factors may have formed a more reliable measurement of the SES. Including both parents' education might also have been beneficial to estimate the effects of SES. For instance, in the study by Korpilahti et al. (2016), the fathers' education level was a significant predictor of children's language outcomes. Besides the fact that there is no final definition of SES, neither is there an absolute way of categorizing SES (Bradley et al., 2002; Pace et al., 2016). In this study, the responses concerning the mothers' SES was originally categorized on a nine-point scale and was later converted into a three-point scale. This type of categorization might have caused uncertainties regarding the line between the lowest and the middle group. If the categorization had been performed in another way, the results might have differed. Furthermore, the majority of the sample consisted of highly educated mothers and therefore little variance in the predictors is to be expected since the likelihood of observing interactions is lower when the population is rather homogenous.

The EPDS-results were combined into one variable to create a broader and more generalizable sample. However, there is no guarantee that all the mothers who suffered from depression were included, since not all mothers completed the EPDS form up to 1 year postpartum. Information regarding the mothers' use of medication or whether they received any form of therapy during this period was not included either. Studies have shown that different intervention methods such as group therapy and cognitive behavioural therapy have been successful methods in reducing depressive symptoms among mothers with postpartum depression (Cho, Kwon & Lee, 2008; Mulcahy, Reay, Wilkinson & Owen, 2009; Zlotnick, Johnson, Miller, Pearlstein & Howard, 2001). This could possibly have affected the result in this study if any of the mothers received therapy during the postpartum period.

In future studies about these associations, it would be recommended to include more variables for the measurement of SES as well as more background information about the mothers. To further investigate the influence of maternal SES on Finnish children's language development, additional studies also comprising older children are needed as previous research suggests that the effect are more prominent with increasing child's age.

4.5 Conclusion

This study found no support for the association between the mothers' SES and children's language development at 14 months of age. The effect of SES is possibly not as evident in Finland compared to countries with larger socioeconomic discrepancies or the effect of SES is not yet possible to see in children's language development as early as 14 months of age. Neither did the influence of mother's postpartum depression on children's language development differ by maternal SES measured with level of education. Further background information regarding the mothers' use of medication or received therapy because of postpartum depression should be collected to be able to draw reliable conclusions about this effect. Language development is a process which is formed by a combination of factors, not by one alone. Future studies should explore long-term effects of SES on children's language development and follow-up the children for long-term outcomes because the effects of SES can probably not be seen until the language development has proceeded a little bit further.

Swedish summary - Svensk sammanfattning

Effekten av mammans socioekonomiska status och postpartumdepression på barns tidiga språkutveckling

1 Introduktion

Barns språkutveckling formas i första hand av biologiska faktorer men influeras även av barnets omgivning (Hoff, 2006). Biologiska faktorer som exempelvis kön har visats påverka språkutvecklingen (Eriksson m.fl., 2012). Prematuritet samt för tidig födsel under vecka 37–39 har även visats vara en risk för försenad språkutveckling (Bruun, 2019; Foster-Cohen m.fl., 2007; Lee m.fl., 2011; Schirmer m.fl., 2006). Det finns också studier som tyder på att mammans ålder kan inverkan på barns språkutveckling, där lägre ålder hos mamman associeras med lägre språklig nivå hos barnet (Keown, Woodward & Fielda, 2001). Även rökning under graviditeten har konstaterats ha en negativ inverkan på barns språkutveckling (Key m.fl., 2007).
En omgivningsfaktor som har uppmärksammats är familjens socioekonomiska status (SES) och dess inverkan på barns allmänna utveckling och hälsa. Trots flertalet studier angående sambandet finns det ingen slutgiltig definition av termen som forskare är överens om (Bradley & Corwyn, 2002) men oftast baserar sig termen antingen på utbildning, yrke eller inkomst (Adler & Ostrove, 1999; Noble, McCandliss, & Farah, 2007; Raviv, Kessenich & Morison, 2004). Familjer med högre SES har i de flesta fall större möjlighet att förse sina barn med de basbehov som krävs för en god utveckling och stimulerande miljöer för barnets språkutveckling (Bornstein & Bradley, 2002). Skillnader i familjens SES kan därför innebära att språkutvecklingen påverkas på olika sätt. Ett flertal studier har visat skillnader i barns språkutveckling i olika SES-grupper (Fernald, Marchman & Weisleder, 2013; Korpilahti, Kaljonen & Jansson-Verkasalo, 2016; Noble m.fl., 2007; Pungello, Iruka, Dotterer, Mills-Koonce & Reznick, 2009) men det råder fortfarande osäkerheter angående i vilken ålder som skillnaderna börjar framkomma och exakt vad det är med SES som påverkar språkutvecklingen.

Studier har även visat att mammor i lägre SES-grupper löper högre risk att lida av någon form av depression i jämförelse med mammor i högre SES-grupper (Goyal, Gay & Lee, 2010; Serge, O'Hara, Arndt & Stuart, 2007). Postpartumdepression innebär en typ av depression som kan uppkomma under första året efter förlossning (World Health

Organization, 2018). Mammans depressiva symtom antingen under eller efter förlossning kan utgöra en risk för försenad språkutveckling hos barn (Paulson m.fl., 2009). Studier uppvisar motstridiga resultat angående sambandet mellan mammans postpartumdepression och barnets tidiga språkutveckling (Cornish m.fl., 2005; Quevedo m.fl., 2011). Det finns även en hypotes om att mammans depressiva symptom har olika effekt på barns språkutveckling i olika SES-grupper (Kurstjens m.fl., 2001). Studier har visat att barn i familjer med lägre SES och där mamman har diagnostiserats med postpartumdepression, uppvisar lägre poäng i språkliga test i jämförelse med motsvarande barn i familjer med en högre SES (Kurstjens & Wolke, 2001; Stein, Malmberg, Sylva, Barnes & Leach, 2008)

1.2 Syfte med studien

Syftet med studien var att undersöka sambandet mellan mammans socioekonomiska status (SES) och barns språkutveckling vid 14 månaders ålder. Därtill undersöktes det i studien hurvida associationen mellan mammans postpartumdepression och barnets språkutveckling påverkas på olika sätt i olika socioekonomiska grupper.

2 Metod

Studien genomfördes som en delstudie av forskningsprojektet FinnBrain, vars syfte är att undersöka den kombinerade effekten av gener och miljö på finländska barns utveckling (https://sites.utu.fi/finnbrain/sv/). Studien bestod av 3837 familjer från sydvästra Finland och Åland. Mammorna och deras partners rekryterades vid deras första ultraljudsundersökning mellan åren 2010–2015. Deltagarna bestod av både finsk- och svenskspråkiga familjer. För analyserna i studien krävdes information angående mammornas SES, deras barns receptiva och expressiva ordförråd, deras användning av gester vid 14 månaders ålder samt mammornas depressionsnivå ett år efter förlossning. Mammorna som inte hade fyllt i något av formulären exkluderades. Eftersom formuläret som kartlägger barnens språkutveckling skiljer sig åt för finsk- och svenskspråkiga barn angående antal ord, inkluderades enbart de finskspråkiga barnen. Slutligen exkluderades även prematura barn som var födda före vecka 37. Därav blev det slutliga antalet deltagare 1096. Barnen i samplet bestod av 52 % pojkar (n = 710) och 48 % flickor (n = 631).

2.1 Mätinstrument

Den finska versionen (Lyytinen, 1999) av MacArthur Communicative Development Inventories (MCDI-formuläret) (Fenson m.fl., 1993) användes för att samla in information om barnens språkliga och kommunikativa utveckling vid 14 månaders ålder och utgjorde resultatvariablerna för studien. Den första delen av formuläret mäter barnets receptiva och expressiva ordförråd. Föräldrarna kryssar i de ord som barnet förstår eller både förstår och producerar. I den andra delen av formuläret (A-E) mäts barnets preverbala kommunikation och användning av gester. Delen består av ”ja eller nej”- alternativ angående barnets användning av gester. Mammornas utbildning fungerade som ett mått på deras SES och utgjorde därav prediktorvariablen i alla analyser.

Information angående mammornas upplevda depressiva symptom samlades in med hjälp av screeningtestet Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden & Sagovsky, 1987) och utgjorde den andra prediktorvariabeln. Formuläret baseras på 10 påståenden om mammans upplevda tankar och känslor under de senaste sju dagarna. Mamman väljer ett utav fyra svarsalternativ där varje svarsalternativ poängsätts och där högre poäng tyder på svårare depressiva symptom. Den totala poängen för testet utgörs av 30 poäng och det rekommenderade gränsvärdet för depression är enligt Matthey, Henshaw, Elliott och Barnett (2006) 10 poäng eller mera. Mammorna fyllde i formuläret 3, 6 och 12 månader efter förlossning. Responsen från formuläret ett år efter förlossning var det mest relevanta eftersom tidpunkten var närmast när barnet var 14 månader gammalt. Däremot hade inte alla mammor fyllt i formuläret vid ett år efter förlossning och för deras del användes det svaret som de hade gett vid sex månader efter förlossningen och om det också saknades användes det svar som de hade gett vid tre månader efter förlossning. Enligt EPDS-svaren delades mammorna in i två grupper. Mammorna som fick 10 poäng eller mera räknades som deprimerade och de mammor som hade mindre än 10 poäng räknades som icke-deprimerade.

2.2 Statistiska analyser

Sambandet mellan barnens språkutveckling och mammornas SES undersöktes genom hierarkisk multipel regression i två steg. Tre separata analyser gjordes med barnens receptiva och expressiva ordförråd samt deras användning av gester var för sig som resultatvariabler. Förväxlingsfaktorerna kön, gestationsveckor, mammans ålder och

rökning under graviditeten matades in i steg 1 och var detsamma i alla analyser. Vid steg 2 matades mammans SES in som prediktorvariabel.

Den andra delen av studien undersökte hurvida associationen mellan mammans postpartumdepression och barnets språkutveckling påverkas på olika sätt i olika socioekonomiska grupper. Detta undersöktes med hjälp av en två-vägs ANOVA där respektive språkvariabel av intresse fungerade som resultatvariabel (receptiva ordförrådet, expressiva ordförrådet och användning av gester).

3 Resultat

Den högsta SES-gruppen bestod av 426 mammor (38,9 %), den mittersta SES-gruppen bestod av 312 mammor (28,4 %) och den lägsta SES-gruppen bestod av 358 mammor (32,7 %). Den genomsnittliga längden för graviditet var 40 veckor (*SD* = 1,23*, variationsvidd* = 5,43) och mammornas genomsnittliga ålder vid förlossning var 31 år (*SD* = 4,5*, variationsvidd* = 27). Av mammorna i samplet hade 14 % (*n* = 153) rökt i något skede av graviditeten.

Vid 14 månaders ålder bestod barnens genomsnittliga receptiva ordförråd av 120 ord (*SD* = 73*, variationsvidd* = 336) och det genomsnittliga expressiva ordförrådet bestod av 10 ord (*SD* = 11*, variationsvidd* = 54). Den genomsnittliga användningen av gester var 36 (*SD* = 9*, variationsvidd* = 54). Flickornas resultat från MCDI-formuläret var signifikant högre än pojkarnas inom alla språkområden (Receptivt ordförråd: $t(1094) = -3{,}645$, $p < .001$, Expressivt ordförråd: $t(1094) = -5{,}309$, $p < .001$, Användning av gester: $t(1058) = -6{,}570$, $p < .001$).

EPDS-resultaten bestod av 1081 svar. Den genomsnittliga poängen för samplet var 5 poäng (*SD* = 4*, variationsvidd* = 27). Prevalensen för depression ($\geq$ 10 poäng i EPDS-formuläret) var för hela samplet 13,5 % (*n* = 153). Mammorna i den lägsta SES-gruppen uppvisade något högre prevalens av depression (*n* = 61, 5,7 %) i jämförelse med den mittersta (*n* = 43, 4,0 %) och höga (*n* = 40, 3,8 %) SES-gruppen. Förekomsten av rökning under något skede av graviditeten var också högre i den lägsta SES-gruppen (*n* = 102, 28,5 %) i jämförelse med den mittersta (*n* = 26, 8,3 %) och höga (*n* = 25, 5,9 %) SES-gruppen.

Korrelationsanalyserna visade att det inte fanns ett statistiskt signifikant samband mellan SES och barnens receptiva ordförråd (r = 0,048, p = 0,113), inte heller mellan SES och barnens expressiva ordförråd (r = -0,010, p = 0,736) eller deras användning av gester (r = 0,003, p = 0,930). EPDS-resultaten korrelerade signifikant med det receptiva ordförrådet (r = -0,080, p = 0,008) men inte med det expressiva ordförrådet (r = 0,009, p = 0,771) eller deras användning av gester (r = -0,010, p = 0,738).

Antagandena för att utföra en multipel regressionsanalys uppfylldes med det receptiva ordförrådet som resultatvariabel. Alla parvisa korrelationer var inom accepterad nivå (r < 0,7). Det första steget uppvisade en statistiskt signifikant regressionsekvation F(4, 1091) = 7,528, p < 0,001, och svarade för 2,3 % av variansen i resultatvariabeln ($R^2_{justerat}$ = 0,023). När SES-variabeln tillades i steg två förändrades inte F på en statistiskt signifikant nivå ($R^2_{justerat}$ = 0,590, p = 0,443). Modellen föreslår alltså att mammans SES inte förklarar en betydande del av variansen i barnens receptiva ordförråd efter att bakgrundsfaktorer har tagits i beaktande. Vid båda stegen predicerade barnets kön (β = 0,107, p < 0,001), antal gestationsveckor (β = 0,096, p = 0,001) och rökning under graviditeten (β = -0,080, p = 0,008) resultatvariabeln på en statistiskt signifikant nivå.

För att möjliggöra en regressionsanalys med det expressiva ordförrådet som resultatvariabel genomfördes en kvadratrotstransformering. Deltagare med extrema värden, tre gånger kvartilavståndet ovanför eller under den första och tredje kvartilen exkluderades. Det första steget i analysen uppvisade en statistiskt signifikant regressionsekvation F(4, 1091) = 9,358, p < 0,001, och svarade för 3,0 % av variansen i resultatvariabeln ($R^2_{justerat}$ = 0,030). När SES-variabeln tillades i steg två förändrades inte F på en statistiskt signifikant nivå ($R^2_{justerat}$ = 0,045, p = 0,833). Enbart barnets kön (β = 0,573, p < 0,001) och antal gestationsveckor (β = 0,096, p < 0,001) predicerade barnens expressiva ordförråd.

Antagandena för att utföra en multipel regressionsanalys uppfylldes även med barnens användning av gester som resultatvariabel. Det första steget uppvisade en statistiskt signifikant regressionsekvation F(4, 1055) = 16,093, p < 0,001, och svarade för 5,4 % av variansen i resultatvariabeln ($R^2_{justerat}$ = 0,054). När SES-variabeln tillades i steg två förändrades inte F på en statistiskt signifikant nivå ($R^2_{justerat}$ = 0,191, p = 0,662). Även i

denna analys framkom att barnets kön (β = 0,195, p < 0,001) och antal gestationsveckor (β = 0,134, p < 0,001) predicerade barnens användning av gester.

Tvåvägs ANOVA-analyser utfördes för att undersöka effekten av mammans depression på barnens receptiva och expressiva ordförråd samt användning av gester. Resultaten visade en statistisk icke-signifikant huvudeffekt av depression på samtliga språkområden (Receptivt ordförråd: F(1, 1075) = 3,064, p = 0,080, η_p^2 = 0,003, Expressivt ordförråd: F(1, 1075) = 0,447, p = 0,504, η_p^2 = 0,000, Användning av gester: F(1, 1041) = 1,977, p = 0,160, η_p^2= 0,002). Likaså var huvudeffekten av SES på barnens receptiva och expressiva ordförråd samt användning av gester icke-signifikant, (Receptivt ordförråd: F(2, 1075) = 1,152, p = 0,316, η_p^2 = 0,002, Expressivt ordförråd: F(2, 1075) = 0,408, p = 0,665, η_p^2= .001, Användning av gester: F(2, 1041) = 1,384, p = 0,251, η_p^2 = 0,003). Det fanns inte heller någon statistisk signifikant interaktion mellan effekten av SES och mammans depression på barnens receptiva och expressiva ordförråd samt användning av gester (Receptivt ordförråd: F(2, 1075) = 0,026, p = 0,974, η_p^2 = 0,000, Expressivt ordförråd: F(2, 1075) = 0,384, p = 0,681, η_p^2 = 0,001, Användning av gester: F(2, 1041) = 1,628, p = 0,197, η_p^2 = 0,003).

4 Diskussion

Syftet med den här studien var att undersöka sambandet mellan mammans socioekonomiska status och barns språkutveckling vid 14 månaders ålder. Därtill undersöktes det i studien hurvida associationen mellan mammans postpartumdepression och barnets språkutveckling påverkas på olika sätt i olika socioekonomiska grupper. Efter att bakgrundsfaktorerna tagits i beaktande visade resultatet att det inte finns en statistisk signifikant association mellan mammans SES och barnens språkutveckling vid 14 månaders ålder. Det tyder på att de utvalda bakgrundsfaktorerna förklarar variationer i barnens språkutveckling i större utsträckning än SES-variabeln. Bakgrundsfaktorer som kön, gestationsveckor, mammans ålder och rökning under graviditeten visade sig ha en viss inverkan på språkutvecklingen. Orsaken till resultaten kan förklaras av att SES inte har lika stor inverkan på barns språkutveckling i länder där familjer har tillgång till ett sjukvårdssystem av hög standard och där tillgången till utbildning är mera jämlik för alla invånare (Adler m.fl., 1999; Pace, Luo, Hirsh-Pasek, Michnick,

Golinkoff, 2017). Eftersom Finland räknas som ett land med sådana tillgångar (Halinen & Järvinen, 2008; Järvelin, 2002) kan det förklara resultatet. En annan bidragande orsak till resultatet kan vara barnens ålder. Majoriteten av tidigare studier som har uppvisat statistiskt signifikanta resultat av associationen mellan mammans SES och barns språkutveckling har inkluderat barn som var äldre än 14 månader, Vasilyeva, Waterfall & Huttenlocher, 2008; Zambrana, Ystrom & Pons, 2012). Därför är det möjligt att effekten av SES på barnens kommunikativa färdigheter inte ännu hade framkommit eftersom barnen var så unga och befann sig i en tidig fas av sin språkutveckling.

Resultaten från studien visade även att effekten av mammans postpartumdepression på barnens språkutveckling inte skiljer sig i olika socioekonomiska grupper. Resultatet kan ha att göra med Finlands sjukvårdsystem där sjukvårdstjänster erbjuds till alla blivande mammor oberoende av socioekonomisk tillhörighet. Av mammorna i samplet visade det sig att prevalensen av depression var något högre i den lägsta socioekonomiska gruppen, trots det verkade inte mammornas SES inverka på barnens språkutveckling.

Studien hade en del begränsningar. Måttet av SES som bestod av mammornas utbildning kunde ha utvidgats till att även inkludera deras inkomst och yrke för att få ett bredare och mera tillförlitligt mått av SES. Det kunde också ha varit fördelaktigt att inkludera båda föräldrarnas utbildning, eftersom det har framkommit att pappans utbildningsnivå kan vara en stark prediktor av barns språkutveckling (Korpilahti m.fl., 2016). Kategorisering av SES-grupperna kunde också ha utförts på andra sätt. I studien delades mammorna in i tre grupper som ursprungligen baserades på en skala med nio nivåer av utbildning. Om en annan typ av kategorisering hade utförts kunde också ett annat resultat ha uppvisats. Majoriteten av mammorna var dessutom högutbildade vilket försvårar generaliserbarheten av resultaten. Information angående mammornas användning av läkemedel och terapibesök under postpartumperioden kunde också ha inkluderats eftersom studier har visat att olika typer av terapi har kunnat minska mammors depressiva symptom under postpartumperioden (Cho, Kwon & Lee, 2008; Mulcahy, Reay, Wilkinson & Owen, 2009; Zlotnick, Johnson, Miller, Pearlstein & Howard, 2001). I framtida studier rekommenderas att undersöka långtidseffekten av SES på barns tal- och språkutveckling.

References

Adler, N. & Ostrove, J. (1999). Socioeconomic Status and Health: What We Know and What We Don't. *Annals of the New York Academy of Sciences*, *896*(1), 3–15. doi: 10.1111/j.1749-6632.1999.tb08101.x

Bernstein, B. B. (1970). *A socio-linguistic approach to social learning*. In F. Williams (Ed.), Language and poverty (pp. 25–61). Chicago: Markham.

Bornstein, M. H. & Bradley, H. B. (2002). *Socioeconomic Status, Parenting, and Child Development*. New York: Psychology Press.

Bruun, N. (2019). *The relationship between prenatal maternal depressive symptoms and infant vocabulary* (Master's thesis). Turku: Faculty of Arts, Psychology and Theology.

Cho, H., Kwon, J., & Lee, J. (2008). Antenatal Cognitive-behavioral Therapy for Prevention of Postpartum Depression: A Pilot Study. *Yonsei Medical Journal*, *49*(4), 553–562. doi: 10.3349/ymj.2008.49.4.553

Clearfield, M., Bailey, L., Jenne, H., Stanger, S., & Tacke, N. (2014). Socioeconomic status affects oral and manual exploration across the first year. *Infant Mental Health Journal*, *35*(1), 63–69. doi: 10.1002/imhj.21423

Cohen, S., Kessler, R. C., & Underwood Gordon, L. (1995). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler & L. Underwood Gordon (Eds.), *Measuring stress: A guide for health and social scientists* (pp. 3–26). New York: Oxford University Press.

Cornish, A., McMahon, C., Ungerer, J., Barnett, B., Kowalenko, N., & Tennant, C. (2005). Postnatal depression and infant cognitive and motor development in the second postnatal year: The impact of depression chronicity and infant gender. *Infant Behavior and Development*, *28*(4), 407–417. doi: 10.1016/j.infbeh.2005.03.004

Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry*, *150*(6), 782–786. doi: 10.1192/bjp.150.6.782

Eilertsen, T., Thorsen, A., Holm, S., Bøe, T., Sørensen, L., & Lundervold, A. (2016). Parental socioeconomic status and child intellectual functioning in a Norwegian sample. *Scandinavian Journal of Psychology*, *57*(5), 399–405. doi: 10.1111/sjop.12324

Ekblad, M., Gissler, M., Korkeila, J., & Lehtonen, L. (2013). Trends and risk groups for smoking during pregnancy in Finland and other Nordic countries. *The European Journal of Public Health*, *24*(4), 544–551. doi: 10.1093/eurpub/ckt128

Eriksson, M., Marschik, P. B., Tulviste, T., Almgren, M., Pérez Pereira, M., Wehberg, S., ... & Gallego, C. (2012). Differences between girls and boys in emerging language skills: Evidence from 10 language communities. *British Journal of Developmental Psychology*, *30*(2), 326–343. doi: 10.1111/j.2044-835X.2011.02042.x

European Observatory on Health Care Systems (2002). *Health Care Systems in Transition*. Finland: European Observatory on Health Care Systems.

Farah, M. (2017). The Neuroscience of Socioeconomic Status: Correlates, Causes, and Consequences. *Neuron*, *96*(1), 56–71. doi: 10.1016/j.neuron.2017.08.034

Fenson, L., Dale, P., Reznick, J., Thal, D., Bates, E., Hartung, J.P., Pethick, S., & Reilly, J.S. (1993). *The MacArthur communicative development inventories. Users guide and technical manual*. San Diego: Singular.

Fernald, A., Marchman, V., & Weisleder, A. (2013). SES differences in language processing skill and vocabulary are evident at 18 months. *Developmental Science*, *16*(2), 234–248. doi: 10.1111/desc.12019

Foster-Cohen, S., Edgin, J., Champion, P., & Woodward, L. (2007). Early delayed language development in very preterm infants: Evidence from the MacArthur-Bates CDI. *Journal of Child Language*, *34*(3), 655–675. doi: 10.1017/s0305000907008070

Freeman, A., Tyrovolas, S., Koyanagi, A., Chatterji, S., Leonardi, M., & Ayuso-Mateos, J. et al. (2016). The role of socio-economic status in depression: results from the COURAGE (aging survey in Europe). *BMC Public Health*, *16*(1), 1098. doi: 10.1186/s12889-016-3638-0

Goyal, D., Gay, C., & Lee, K. (2010). How Much Does Low Socioeconomic Status Increase the Risk of Prenatal and Postpartum Depressive Symptoms in First-Time Mothers?. *Women's Health Issues*, *20*(2), 96–104. doi: 10.1016/j.whi.2009.11.003

Grace, S. L., Evindar, A., & Stewart, D. E. (2003). The effect of postpartum depression on child cognitive development and behavior: a review and critical analysis of the literature. *Archives of Women's Mental Health*, *6*(4), 263–274. doi:10.1007/s00737-003-0024-6

Halinen, I., & Järvinen, R. (2008). Towards inclusive education: the case of Finland. *PROSPECTS*, *38*(1), 77–97. doi: 10.1007/s11125-008-9061-2

Hoff, E. (2003). The Specificity of Environmental Influence: Socioeconomic Status Affects Early Vocabulary Development Via Maternal Speech. *Child Development*, *74*(5), 1368–1378. doi: 10.1111/1467-8624.00612

Hoff, E. (2006). How social contexts support and shape language development. *Developmental Review, 26*(1), 55–88. doi:10.1016/j.dr.2005.11.002

Hoff-Ginsberg, E. (1998). The relation of birth order and socioeconomic status to children's language experience and language development. *Applied Psycholinguistics, 19*(4), 603–629. doi:10.1017/S0142716400010389

Hoff, E., Laursen, B., & Tardif, T. (2002). Socioeconomic status and parenting. In M. H. Bornstein (Ed.), *Handbook of parenting: Biology and ecology of parenting.* New Jersey: Lawrence Erlbaum Associates.

Hoff, E., & Tian, C. (2005). Socioeconomic status and cultural influences on language. *Journal of Communication Disorders*, *38*(4), 271–278. doi: 10.1016/j.jcomdis.2005.02.003

Huttenlocher, J., Waterfall, H., Vasilyeva, M., Vevea, J., & Hedges, L. V. (2010). Sources of variability in children's language growth. *Cognitive psychology*, *61*(4), 343–365. doi:10.1016/j.cogpsych.2010.08.002

Iverson, J.M, & Goldin-Meadow, S. (2005). Gesture Paves the Way for Language *Development. Psychological Science, 16*(5), 367–371. doi:10.1111/j.0956-7976.2005.01542.x

Keown, L., Woodward, L., & Field, J. (2001). Language development of pre-school children born to teenage mothers. *Infant and Child Development*, *10*(3), 129–145. doi: 10.1002/icd.282

Key, A., Ferguson, M., Molfese, D., Peach, K., Lehman, C., & Molfese, V. (2007). Smoking during Pregnancy Affects Speech-Processing Ability in Newborn Infants. *Environmental Health Perspectives*, *115*(4), 623–629. doi: 10.1289/ehp.9521

Korpilahti, P., Kaljonen, A. and Jansson-Verkasalo, E. (2016). Identification of biological and environmental risk factors for language delay: The Let's Talk STEPS study. *Infant Behavior and Development*, 42, 27–35. doi: 10.1016/j.infbeh.2015.08.008

Kurstjens, S., & Wolke, D. (2001). Effects of maternal depression on cognitive development of children over the first 7 years of life. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *42*(5), 623–636. doi: 10.1111/1469-7610.00758

Lee, E., Yeatman, J., Luna, B., & Feldman, H. (2011). Specific language and reading skills in school-aged children and adolescents are associated with prematurity after controlling for IQ. *Neuropsychologia*, *49*(5), 906–913. doi: 10.1016/j.neuropsychologia.2010.12.038

Lupien, S., King, S., Meaney, M., & McEwen, B. (2000). Child's stress hormone levels correlate with mother's socioeconomic status and depressive state. *Biological Psychiatry*, *48*(10), 976–980. doi: 10.1016/s0006-3223(00)00965-3

Matthey, S., Henshaw, C., Elliott, S., & Barnett, B. (2006). Variability in use of cut-off scores and formats on the Edinburgh Postnatal Depression Scale–implications for clinical and research practice. *Archives of Women's Mental Health*, *9*(6), 309–315. doi: 10.1007/s00737-006-0152-x

Milgrom, J., Westley, D., & Gemmill, A. (2004). The mediating role of maternal responsiveness in some longer term effects of postnatal depression on infant development. *Infant Behavior and Development*, *27*(4), 443–454. doi: 10.1016/j.infbeh.2004.03.003

Mulcahy, R., Reay, R., Wilkinson, R., & Owen, C. (2009). A randomised control trial for the effectiveness of group interpersonal psychotherapy for postnatal depression. *Archives of Women's Mental Health*, *13*(2), 125–139. doi: 10.1007/s00737-009-0101-6

Noble, K.G, McCandliss, B.D, & Farah, M. (2007). Socioeconomic gradients predict individual differences in neurocognitive abilities. *Developmental Science, 10*(4), 464–480. doi: 10.1111/j.1467-7687.2007.00600.x

O'hara, M. W., & McCabe, J. E. (2013). Postpartum depression: current status and future directions. *Annual Review of Clinical Psychology*, *9*, 379–407. doi: 10.1146/annurev-clinpsy-050212-185612

Pace, A., Luo, R., Hirsh-Pasek, K., & Golinkoff, R. (2017). Identifying Pathways Between Socioeconomic Status and Language Development. *Annual Review of Linguistics*, *3*(1), 285–308. doi: 10.1146/annurev-linguistics-011516-034226

Parikka, V. & Lehtonen, L. (2007). Keskonen. In L. Lehtonen (Ed.), *Keskosen hoito ja kehitys* (p. 9). Suomi: Duedecim.

Paulson, J. F., Keefe, H. A., & Leiferman, J. A. (2009). Early parental depression and child language development. *Journal of Child Psychology and Psychiatry*, *50*(3), 254–262. doi: 10.1111/j.1469-7610.2008.01973.x

Pungello, E., Iruka, I., Dotterer, A., Mills-Koonce, R., & Reznick, J. (2009). The effects of socioeconomic status, race, and parenting on language development in early childhood. *Developmental Psychology*, *45*(2), 544–557. doi: 10.1037/a0013917

Quevedo, L.A., Silva, R. A., Godoy, R., Jansen, K., Matos, M. B., Tavares Pinheiro, K.A., & Pinheiro, R. T. (2011). The impact of maternal post-partum depression on the language development of children at 12 months. *Child: Care, Health and Development,38*(3), 420–424. doi:10.1111/j.1365-2214.2011.01251.x

Reilly, S., Bavin, E. L., Bretherton, L., Conway, L., Eadie, P., Cini, E., ... & Wake, M. (2009). The Early Language in Victoria Study (ELVS): A prospective, longitudinal study of communication skills and expressive vocabulary development at 8, 12 and 24 months. *International Journal of Speech-Language Pathology*, *11*(5), 344–357. doi: 10.1080/17549500903147560

Rowe, M., Özçalışkan, Ş., & Goldin-Meadow, S. (2008). Learning words by hand: Gesture's role in predicting vocabulary development. *First Language*, *28*(2), 182–199. doi: 10.1177/0142723707088310

Rowel, M., & Goldin-Meadow, S. (2009). Differences in Early Gesture Explain SES Disparities in Child Vocabulary Size at School Entry. *Science*, *323*(5916), 951–953. doi: 10.1126/science.1167025

Schirmer, C., Portuguez, M., & Nunes, M. (2006). Clinical assessment of language development in children at age 3 years that were born preterm. *Arquivos De Neuro-Psiquiatria*, *64*(4), 926–931. doi: 10.1590/s0004-282x2006000600007

Segre, L. S., O'Hara, M. W., Arndt, S., & Stuart, S. (2007). The prevalence of postpartum depression. *Social Psychiatry and Psychiatric Epidemiology*, *42*(4), 316–321. doi: 10.1007/s00127-007-0168-1

Shavers, V.L. (2007). Measurements of Socioeconomic Status in Health Disparities Research. *Journal of the National Medical Association, 99*(9), 1013–1023. doi: 10.13016/avw3-9cvx

Smith-Nielsen, J., Tharner, A., Krogh, M., & Vaever, M. (2016). Effects of maternal postpartum depression in a well-resourced sample: Early concurrent and long-term effects on infant cognitive, language, and motor development. *Scandinavian Journal of Psychology*, *57*(6), 571–583. doi: 10.1111/sjop.12321

Stein, A., Malmberg, L., Sylva, K., Barnes, J., & Leach, P. (2008). The influence of maternal depression, caregiving, and socioeconomic status in the post-natal year on children's language development. *Child: Care, Health and Development*, *34*(5), 603–612. doi: 10.1111/j.1365-2214.2008.00837.x

Stene-Larsen, K., Brandlistuen, R., Lang, A., Landolt, M., Latal, B., & Vollrath, M. (2014). Communication Impairments in Early Term and Late Preterm Children: A Prospective Cohort Study following Children to Age 36 Months. *The Journal of Pediatrics*, *165*(6), 1123–1128. doi: 10.1016/j.jpeds.2014.08.027

Vasilyeva, M., Waterfall, H., & Huttenlocher, J. (2008). Emergence of syntax: commonalities and differences across children. *Developmental Science*, *11*(1), 84–97. doi: 10.1111/j.1467-7687.2007.00656.x

Westerlund, M., & Lagerberg, D. (2008). Expressive vocabulary in 18-month-old children in relation to demographic factors, mother and child characteristics, communication style and shared reading. *Child: Care, Health and Development*, *34*(2), 257–266. doi: 10.1111/j.1365-2214.2007.00801.x

World Health Organization. (2018). *International classification of diseases for mortality and morbidity statistics* (11th Revision). Retrieved from https://icd.who.int/browse11/l-m/en

Zambrana, I., Ystrom, E., & Pons, F. (2012). Impact of Gender, Maternal Education, and Birth Order on the Development of Language Comprehension. *Journal of Developmental & Behavioral Pediatrics*, *33*(2), 146–155. doi: 10.1097/dbp.0b013e31823d4f83

Zlotnick, C., Johnson, S., Miller, I., Pearlstein, T., & Howard, M. (2001). Postpartum Depression in Women Receiving Public Assistance: Pilot Study of an Interpersonal-Therapy-Oriented Group Intervention. *American Journal of Psychiatry*, *158*(4), 638–640. doi: 10.1176/appi.ajp.158.4.638